

IN THE CLAIMS:

The following is a complete listing of the claims in this application, reflects all changes currently being made to the claims, and replaces all earlier versions and all earlier listings of the claims:

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1. (Currently Amended) A liquid discharge head comprising a heat generating element contacted with and between a pair of electrodes for generating thermal energy which is used for discharging liquid from a discharge port, and a protective coating film provided on said heat generating element to protect said heat generating element,

wherein said protective coating film has a first region provided between said pair of electrodes, said first region having a substantially uniform thickness along a direction connecting said pair of electrodes, and has a second region provided between said pair of electrodes, said second region having a substantially uniform thickness along the direction,

wherein said second region is thinner than said first region stepwise and is disposed in all cases closer to said discharge port than said first region and is disposed asymmetrically in a side of said discharge port between said pair of electrodes along the direction,

wherein the volume of a liquid droplet discharged from said discharge port is changed by changing electric energy applied to said heat generating element, and

wherein said protective coating film is composed of plural protection layers, said first region having more layers than said second region.

2. and 3. (Canceled)

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4. (Currently Amended) A liquid discharge head according to claim 1, wherein said second region is formed by forming an upper protective coating film after etching a lower protective coating film.

5. (Currently Amended) A liquid discharge head according to claim 4, wherein said lower protective coating film is composed of phosphosilicate glass film, said upper protective coating film is composed of SiN film, and said etching is conducted with buffered hydrofluoric acid.

6.-8. (Canceled)

9. (Previously Presented) A liquid discharge head according to claim 1, wherein said heat generating element is composed of material having a positive temperature coefficient.

10. (Previously Presented) A liquid discharge head according to claim 1, wherein said heat generating element is provided in plural numbers, a driving circuit having a plurality of function devices provided for independently driving said plurality of heat generating elements is provided within the substrate on which said heat generating elements is provided.

11. (Currently Amended) A liquid discharge head comprising a heat generating element contacted with and between a pair of electrodes for generating thermal energy which is used for discharging liquid from a discharge port, a protective coating film provided on said heat generating element to protect said heat generating element and a

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moving member provided facing said heat generating element and having a free end which is displaced in accordance with generation of a bubble due to said thermal energy,

wherein said protective coating film has a first region provided between said pair of electrodes, said first region having a substantially uniform thickness along a direction connecting said pair of electrodes, and has a second region provided between said pair of electrodes, said second region having a substantially uniform thickness along the direction,

wherein said second region is thinner than said first region stepwise and is disposed in all cases closer to said discharge port than said first region and is disposed asymmetrically in a side of said discharge port between said pair of electrodes along the direction, and

wherein the volume of a liquid droplet discharged from said discharge port is changed by changing electric energy applied to said heat generating element, and

wherein said protective coating film is composed of plural protection layers, said first region having more layers than said second region.

12. and 13. (Canceled)

14. (Currently Amended) A liquid discharge head according to claim 11, wherein said second region is formed by forming the upper protective coating film after etching the lower protective coating film.

15. (Currently Amended) A liquid discharge head according to claim 14, wherein said lower protective coating film is composed of phosphosilicate glass film, said upper protective coating film is composed of SiN film, and said etching is conducted

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with buffered hydrofluoric acid.

16.-18. (Canceled)

19. (Previously Amended) A liquid discharge head according to claim 11, wherein said heat generating element is composed of polycrystalline silicon.

20. (Previously Amended) A liquid discharge head according to claim 11, wherein said heat generating element is provided in plural numbers, a driving circuit having a plurality of function devices provided for independently driving said plurality of heat generating elements is provided within the substrate on which said heat generating elements is provided.

21. (Previously Amended) A liquid discharge apparatus comprising the liquid discharge head according to claim 1 or 11 and a member for mounting said liquid discharge head.

22. (Currently Amended) A liquid discharge method using a liquid discharge head having a heat generating element contacted with and between a pair of electrodes for generating thermal energy which is used for discharging liquid from a discharge port, and a protective coating film for protecting the heat generating element, provided on the heat generating element, said protective coating film having a first region provided between said pair of electrodes, said first region having a substantially uniform thickness along a direction connecting the pair of electrodes, and having a second region provided between said pair of electrodes, said second region having a substantially uniform

thickness along the direction,

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wherein said second region is thinner than the first region stepwise and is disposed in all cases closer to said discharge port than said first region and is disposed asymmetrically in a side of said discharge port between said pair of electrodes along the direction,

wherein a size of a bubble generated on the heat generating element is changed by changing electric energy applied to the heat generating element to generate a bubble on both the first region and the second region or on only the second region,

wherein the volume of a liquid droplet discharged from the discharge port is changed, and

wherein said protective coating film is composed of plural protection layers, said first region having more layers than said second region.

23. (Currently Amended) A liquid discharge method using a liquid discharge head having a heat generating element contacted with and between a pair of electrodes for generating thermal energy which is used for discharging liquid from a discharge port, a protective coating film for protecting the heat generating element, provided on the heat generating element and a moving member provided facing the heat generating element and having a free end which is displaced in accordance with generation of a bubble due to the thermal energy, the protective coating film having a first region provided between said pair of electrodes, said first region having a substantially uniform thickness along a direction connecting the pair of electrodes, and having a second region provided between said pair of electrodes, said second region having a substantially uniform thickness along the direction,

wherein said second region is thinner than the first region stepwise and is

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disposed in all cases closer to said discharge port than said first region and is disposed
asymmetrically in a side of said discharge port between said pair of electrodes along the
direction,

wherein a size of a bubble generated on the heat generating element is changed by changing electric energy applied to the heat generating element to generate a bubble on both the first region and the second region or on only the second region, and

wherein the volume of a liquid droplet discharged from the discharge port is changed, and

wherein said protective coating film is composed of plural protection layers, said first region having more layers than said second region.